Equation in rough form

$$La \quad + \quad H_2O \quad \rightarrow \quad La \quad OH \quad + \quad H_2$$

monatomic formula   hydroxide   diatomic formula

Add oxidation states using periodic table (must be given for polyvalent ions)

$$\overset{0}{La} + \overset{1+\ 2-}{H_2O} \rightarrow \overset{3+}{La} \overset{2-\ 1+}{OH} + \overset{0}{H_2}$$
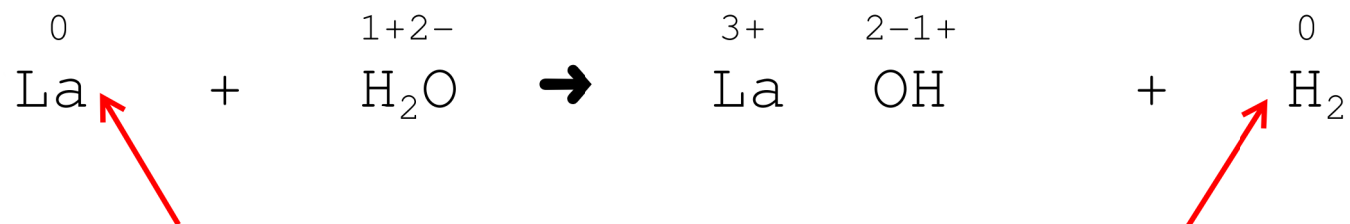
Remember - elements have a 0 oxidation state

(unless of course they are in ionic form)

Figure out the IONIC charges for the IONIC COMPOUND

$$\overset{0}{La} \quad + \quad \overset{1+2-}{H_2O} \quad \rightarrow \quad \overset{3+}{La^{3+}} \quad \overset{2-1+}{OH}{}^{1-} \quad + \quad \overset{0}{H_2}$$
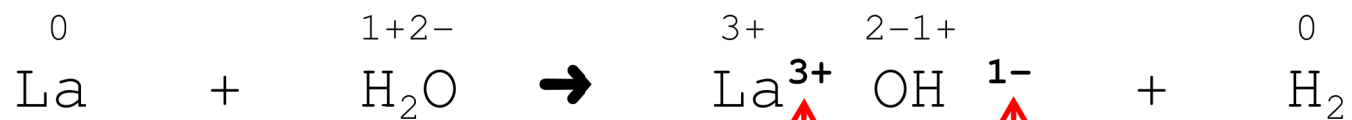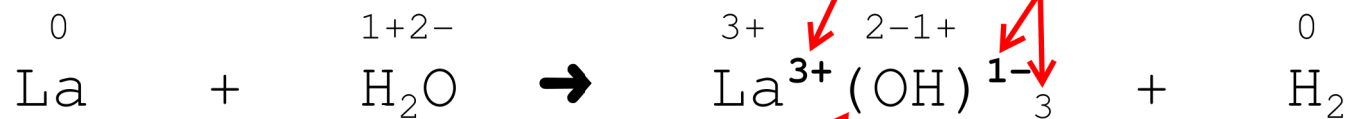
simply the
oxidation state
of the cation

sum of the oxidation
states on the oxygen
and hydrogen

use the ionic charges

to balance the formula

(3+) + 3(1-) = 0

$$\overset{0}{La} \quad + \quad \overset{1+2-}{H_2O} \quad \rightarrow \quad \overset{3+}{La^{3+}}\overset{2-1+}{(OH)^{1-}}_3 \quad + \quad \overset{0}{H_2}$$
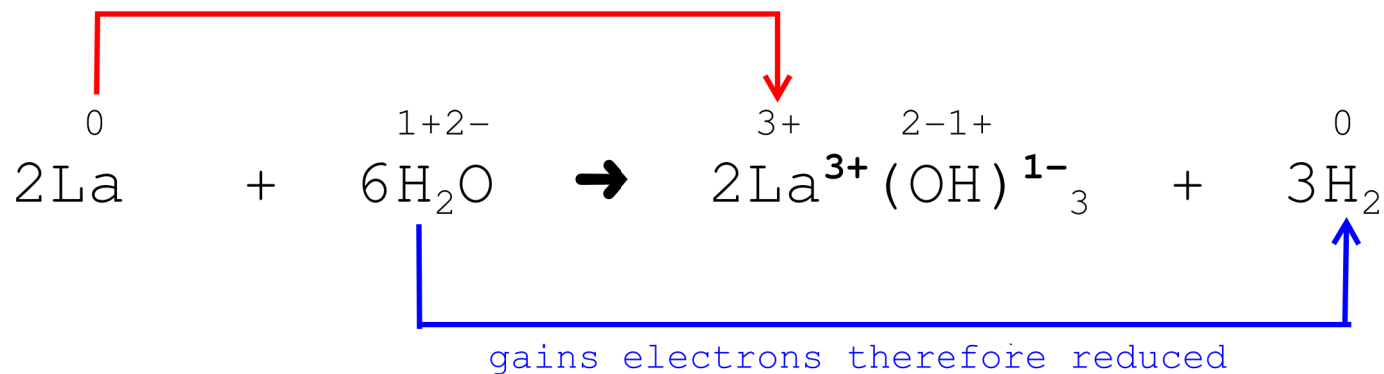
Because more than one hydroxide is required,
Brackets must be used (Brackets must not be
used if not absolutely necessary (NaOH is
correct, Na(OH) is incorrect!!

$$\overset{0}{2La} \; + \; \overset{1+2-}{6H_2O} \; \longrightarrow \; \overset{3+ \quad 2-1+}{2La^{3+}(OH)^{1-}_3} \; + \; \overset{0}{3H_2}$$
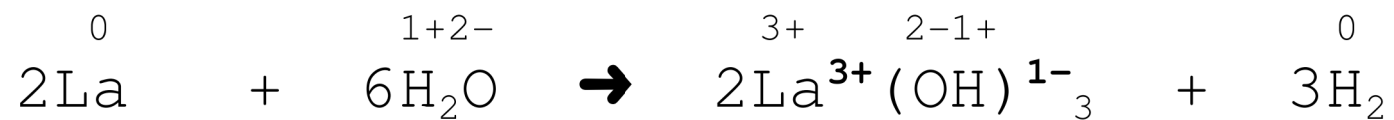
"stoichiometric" is a fancy word for "chemical" coefficients

loses electrons therefore oxidized

$$0 \qquad 1+2- \qquad 3+ \quad 2-1+ \qquad 0$$
$$2La \quad + \quad 6H_2O \quad \rightarrow \quad 2La^{3+}(OH)^{1-}_3 \quad + \quad 3H_2$$

gains electrons therefore reduced

Using oxidation states determine who has lost (oxidized) or gained (reduced) This is an example of how any parts of question #1, 2 and 3 should be answered on the Relative Reactivity Report

loses electrons therefore oxidized (loses 3e⁻ per La) x 2 = 6e⁻ TOTAL

$$\underset{0}{2La} \quad + \quad \underset{1+2-}{6H_2O} \quad \rightarrow \quad \underset{3+ \quad 2-1+}{2La^{3+}(OH)^{1-}_3} \quad + \quad \underset{0}{3H_2}$$

some hydrogens do not change

gains electrons therefore reduced

(gains 1e⁻ per H) x 6 = 6e⁻ TOTAL

This last page is not necessary. What it shows is more detail
about the losing and the gaining. This explains the primary
principle in REDOX (reduction / oxidation) chemistry. THE TOTAL
ELECTRONS LOST MUST BE THE SAME AS THE TOTAL ELECTRONS GAINED.
Multiplication of the atoms involved accomplishes this an is
frequently the key step in balancing equation that are otherwise
near impossible to balance! - See SCH 4U for Details!!